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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,827	06/23/2003	Hideaki Matsuhashi	2003-0859A	6234

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EXAMINER

SOWARD, IDA M

ART UNIT PAPER NUMBER

2822

DATE MAILED: 02/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/600,827

Applicant(s)

HIDEAKI MATSUHASHI

Examiner

Ida M Soward

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 9-16 is/are rejected.
- 7) ☒ Claim(s) 4-8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6-23-03 . 6) ☐ Other: _____

DETAILED ACTION

This Office Action is in response to the application filed June 23, 2003.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

Figures 6A-7 should be designated by a legend such as **--Prior Art--** because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 9, page 23, lines 2-4, it is not clear which layer is interposed therebetween. Claims 10-16 depend upon claim 9.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3 and 9-14 as far as understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen et al. (US 6,645,796 B2) in view of Nakazato et al. (5,071,785).

Christensen et al. teach a semiconductor device comprising: a lower buried oxide film 910 disposed on a semiconductor substrate 912; a silicon stress-relief film 908 disposed on the lower buried oxide film; an upper buried oxide film 906 disposed on the stress-relief film; and an SOI film disposed on the upper buried oxide film, wherein the SOI film is formed with a MOSFET having a source, a drain, and a channel (Figure 9, col. 4, lines 13-26). As best understood and in regard to claim 9-10, Christensen et al. teach the stress-relief layer disposed at a position apart from a top of an insulating film 904 contacting with the semiconductor layer, the semiconductor layer and the

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stress-relief layer disposed as a part of the insulating layer; and a film thickness of the insulating layer interposed between the semiconductor layer and the stress-relief layer being almost the same as a film thickness of the semiconductor layer (Figure 9, col. 4, lines 13-26). However, Christensen et al. fail to teach a thermal expansion coefficient of the silicon stress-relief film greater than a thermal expansion coefficient of the upper buried oxide film. Nakazato et al. teach a thermal expansion coefficient of silicon greater than a thermal expansion coefficient of an oxide film (col. 3, lines 26-29). In regard to claim 3, Nakazato et al. further teach a non-doped crystal silicon film (col. 3, lines 26-29). As best understood and in regard to claims 11-14, since the stress-relief layer and the semiconductor layer are silicon, the thermal expansion coefficient between the two layers are nearly equal depending on the type of silicon whether crystal, poly or amorphous. Since Christensen et al. and Nakazato et al. are from the same field of endeavor (forming SOI structures), the purpose disclosed by Nakazato et al. would have been pertinent in the art of Christensen et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the buried oxide SOI semiconductor device as taught by Christensen et al. with the thermal expansion coefficient as taught by Nakazato et al. to provide an SOI structure to facilitate isolation of integrated circuits (col. 1, lines 22-33).

Claim 15 is as far as understood, rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen et al. (US 6,645,796 B2) and Nakazato et al. (5,071,785) as applied to claims 1-3 and 9-14 above, and further in view of Swanson et al. (US 2002/0094658 A1).

Christensen et al. and Nakazato et al. teach all mentioned in the rejection above. However, Christensen et al. and Nakazato et al. fail to teach a germanium stress-relief layer. As best understood, Swanson et al. teach a germanium stress-relief layer 214 (Figure 1, page 4, paragraph [0045]). Since Christensen et al., Nakazato et al. and Swanson et al. are from the same field of endeavor (semiconductor structures), the purpose disclosed by Swanson et al. would have been pertinent in the art of Christensen et al. and Nakazato et al. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the buried oxide SOI semiconductor device as taught by Christensen et al. and the thermal expansion coefficient as taught by Nakazato et al. with the germanium stress-relief layer of Swanson et al. to improve transistor speed (page 4, paragraph [0045]).

Allowable Subject Matter

Claims 4-8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 16 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to upper and lower buried oxide semiconductor devices and composite layer semiconductor devices:


Assaderaghi et al. (US 2002/0164841 A1) Colt, Jr. (US 6,383,892 B1)
Luo et al. (US 2003/0124818 A1) Norcott et al. (US 2003/0008471 A1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ida M Soward whose telephone number is 571-272-1845. The examiner can normally be reached on Monday - Thursday, 6:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ims
February 4, 2004


AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2000